From drones to sparkles. A designerly take on AI critique

Maria Luce Lupetti

// NEXA 2024

Politecnico di Torino

DAD
Dipartimento di Architettura e Design

ABOUT ME

I am an Assistant Professor in Interaction and Critical Design at the department of Architecture and Design, Politecnico di Torino. I serve as Exhibit X section editor for ACM Interactions Mag and I’m the Secretary of the Italian design research society (Società Italiana Design). I also serve as a European Commission Expert on AI under the European Innovation Council (EIC) Accelerator Program.

AITECH

Design
Engineering
Philosophy of technology











Multidisciplinary research program on awareness, concepts, and design & engineering of autonomous technology under meaningful human control

MEANINGFUL HUMAN CONTROL OVER AUTONOMOUS WEAPON SYSTEMS

“There is general agreement that ‘meaningful’ or ‘effective’ human control, or ‘appropriate levels of human judgement’ must be retained over lethal weapon systems.”

Parliamentary Assembly
Assemblée parlementaire
http://assembly.coe.int

COUNCIL OF EUROPE
CONSEIL DE L'EUROPE

Provisional version

Committee on Legal Affairs and Human Rights

Emergence of lethal autonomous weapons systems (LAWS) and their necessary apprehension through European human rights law

Report
Rapporteur: Damien COTTIER, Switzerland, Alliance of Liberals and Democrats for Europe

A. Draft resolution

1. The Assembly notes that rapid technological progress in the field of artificial intelligence is also paving the way for the emergence, in the near future, of lethal autonomous weapons systems (LAWS).

2. According to the definition of the International Committee of the Red Cross (ICRC), the term Lethal Autonomous Weapons Systems encompasses any weapon system with autonomy in its critical functions, and more specifically a weapon system that can select (i.e. search for or detect, identify, track, select) and attack (i.e. use force against, neutralise, damage or destroy) targets without human intervention. Lethal Autonomous Weapons Systems, therefore, are neither remote-controlled systems in which a human retains control throughout, nor automatic systems in which a particular process has been programmed in advance so that

MEANINGFUL HUMAN CONTROL OVER AUTONOMOUS SYSTEMS (AI)

A PHILOSOPHICAL ACCOUNT

"humans should ultimately remain in control of, and thus morally responsible for, the behaviour of human-AI systems"

conditions

TRACKING

the human-AI system is responsive to the human moral reasons relevant in the circumstances

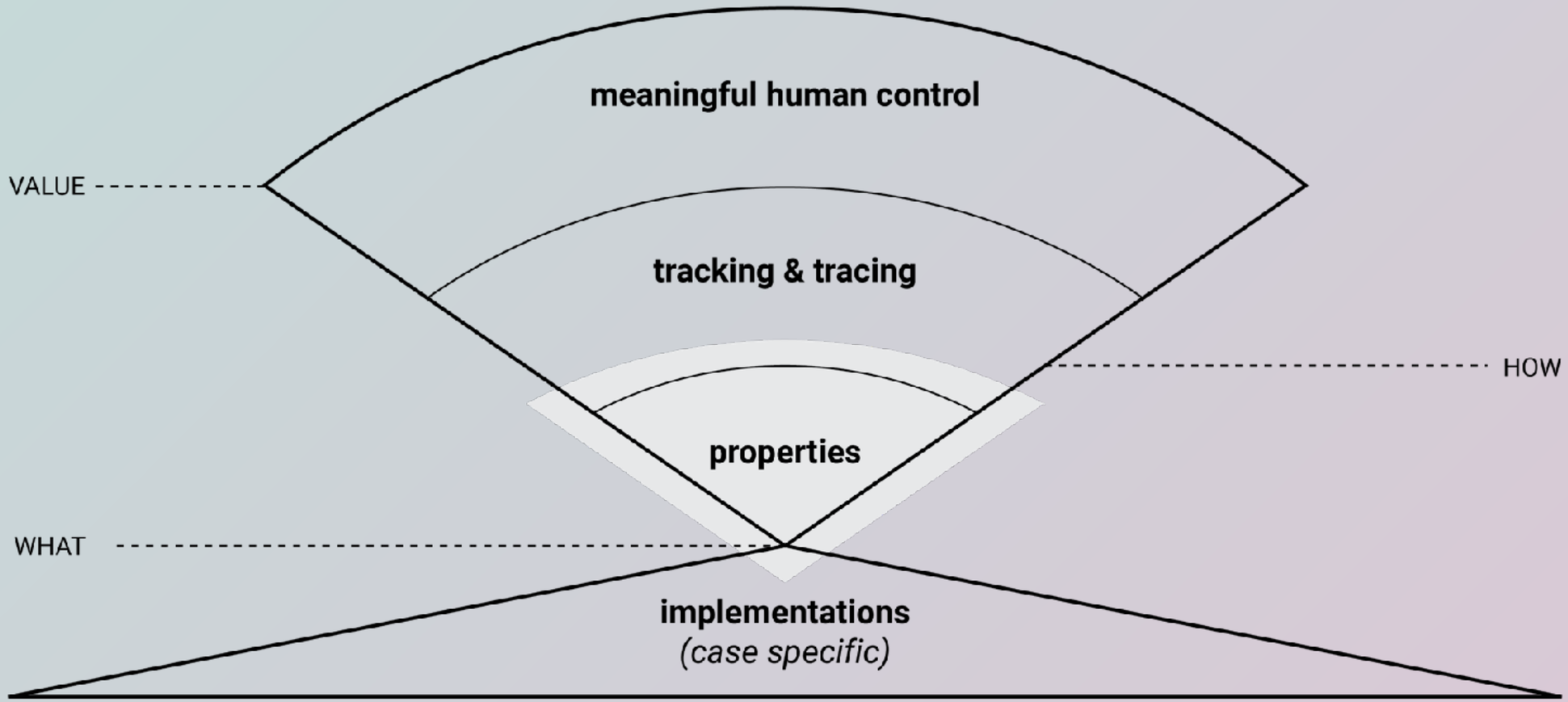
TRACING

the actions of the human-AI system are traceable to a proper moral understanding of one or more relevant human persons who design or interact with the system

Santoni de Sio, F., & Van den Hoven, J. (2018). **Meaningful human control over autonomous systems: A philosophical account.** Frontiers in Robotics and AI, 5, 15.

MEANINGFUL HUMAN CONTROL

Walking the walk

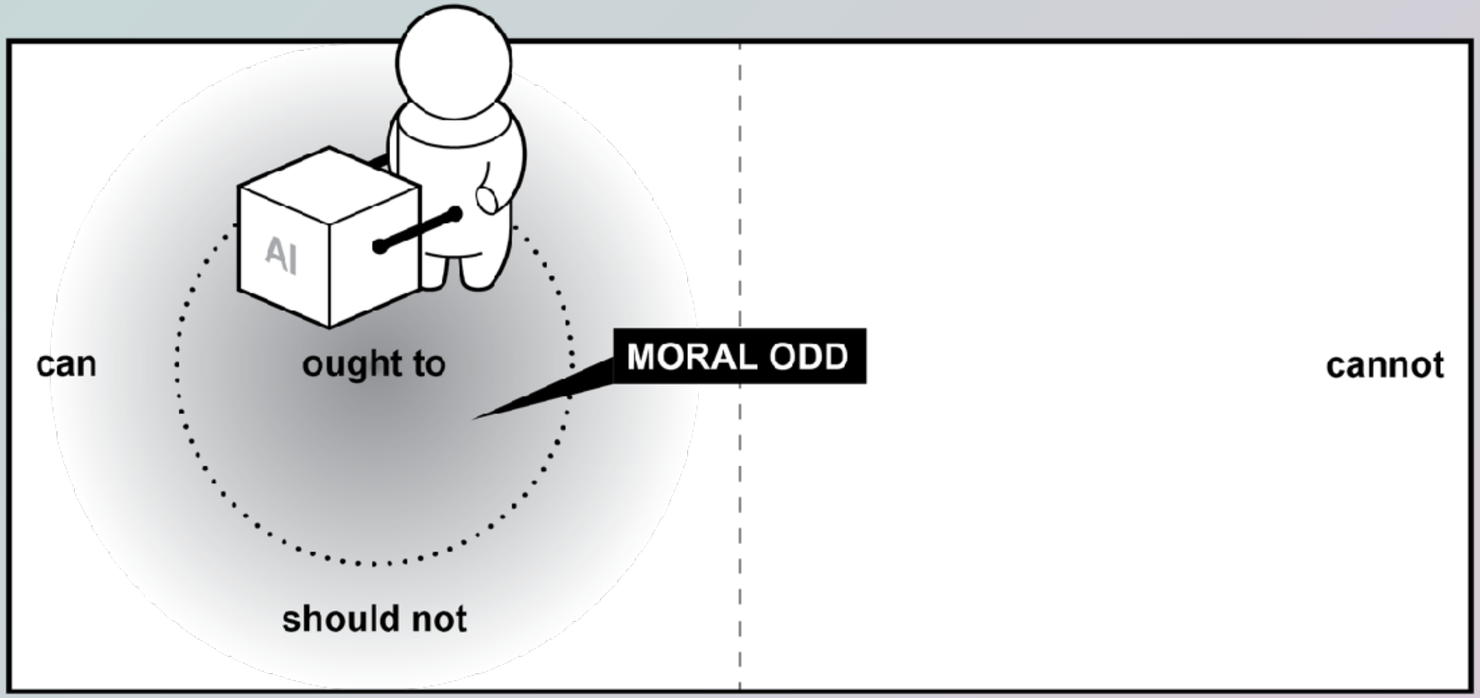


Cavalcante Siebert, L., Lupetti, M. L., Aizenberg, E., Beckers, N., Zgonnikov, A., et al (2023). **Meaningful human control: Actionable properties for AI system development.** AI and Ethics

MEANINGFUL HUMAN CONTROL

Walking the walk

PROPERTY 1



The human-AI system has an explicit moral operational design domain (**moral-ODD**) and the AI agent adheres to the boundaries of this domain.

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MEANINGFUL HUMAN CONTROL

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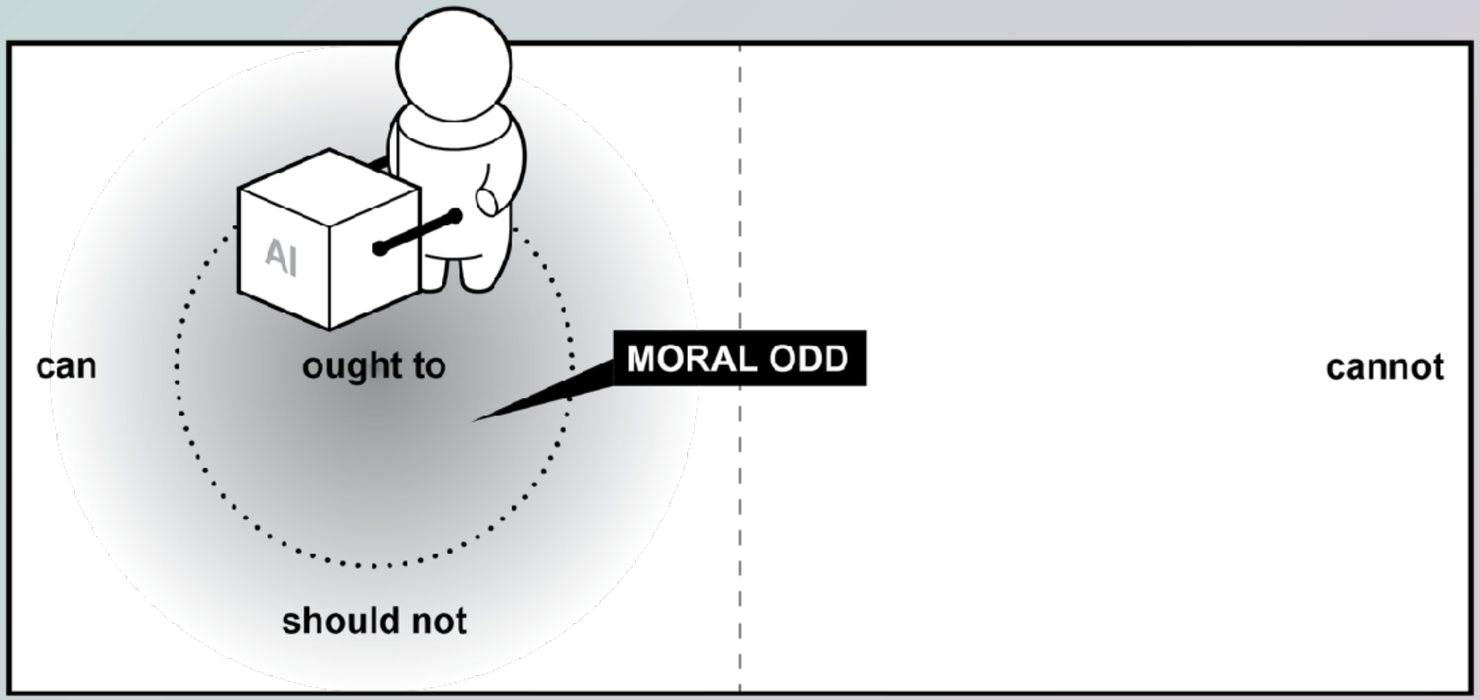

operational design domain

a set of contextual conditions under which a driving automation system is designed to function

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MEANINGFUL HUMAN CONTROL

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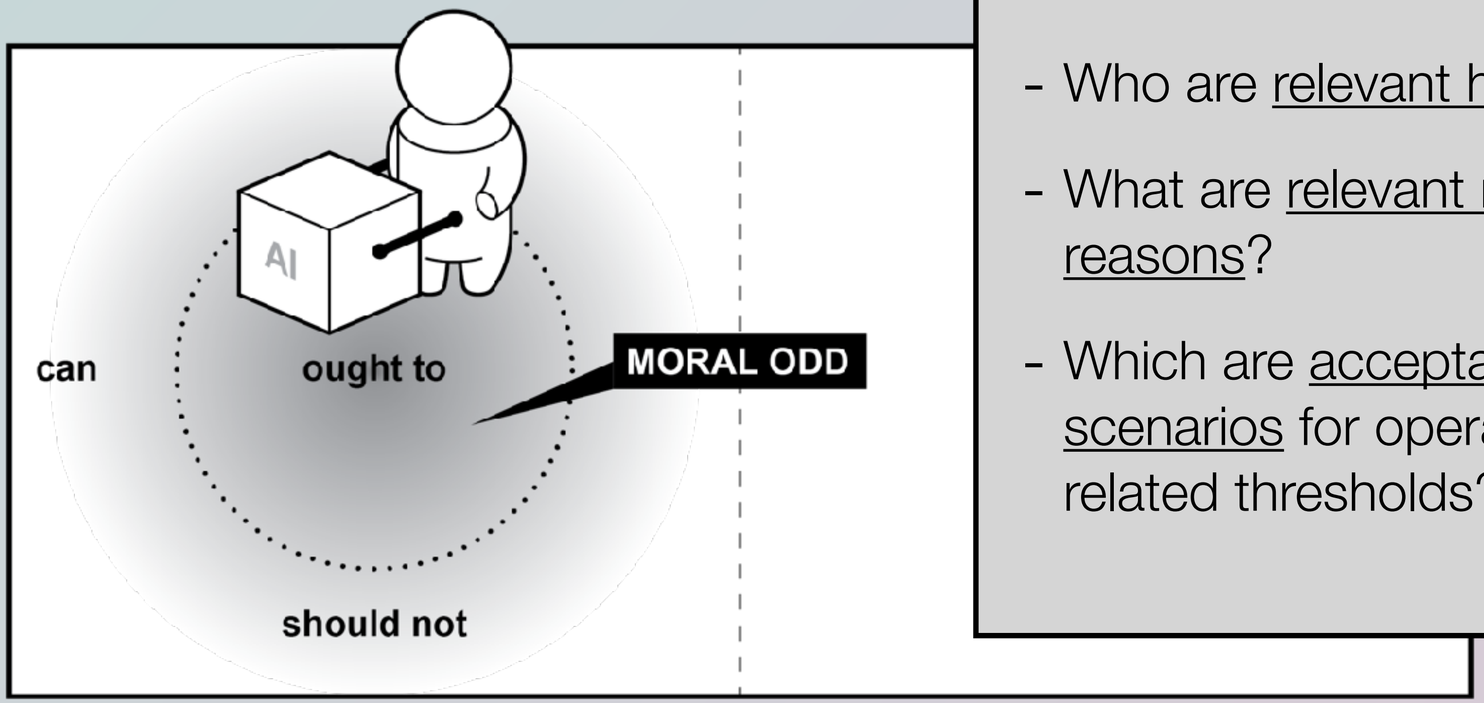

- Who are relevant humans?
- What are relevant moral reasons?
- Which are acceptable scenarios for operation and related thresholds?

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Cavalcante Siebert, L., Lupetti, M. L., Aizenberg, E., Beckers, N., Zgonnikov, A., et al (2023). **Meaningful human control: Actionable properties for AI system development.** AI and Ethics

WHO GETS TO HAVE A VOICE ABOUT AI?

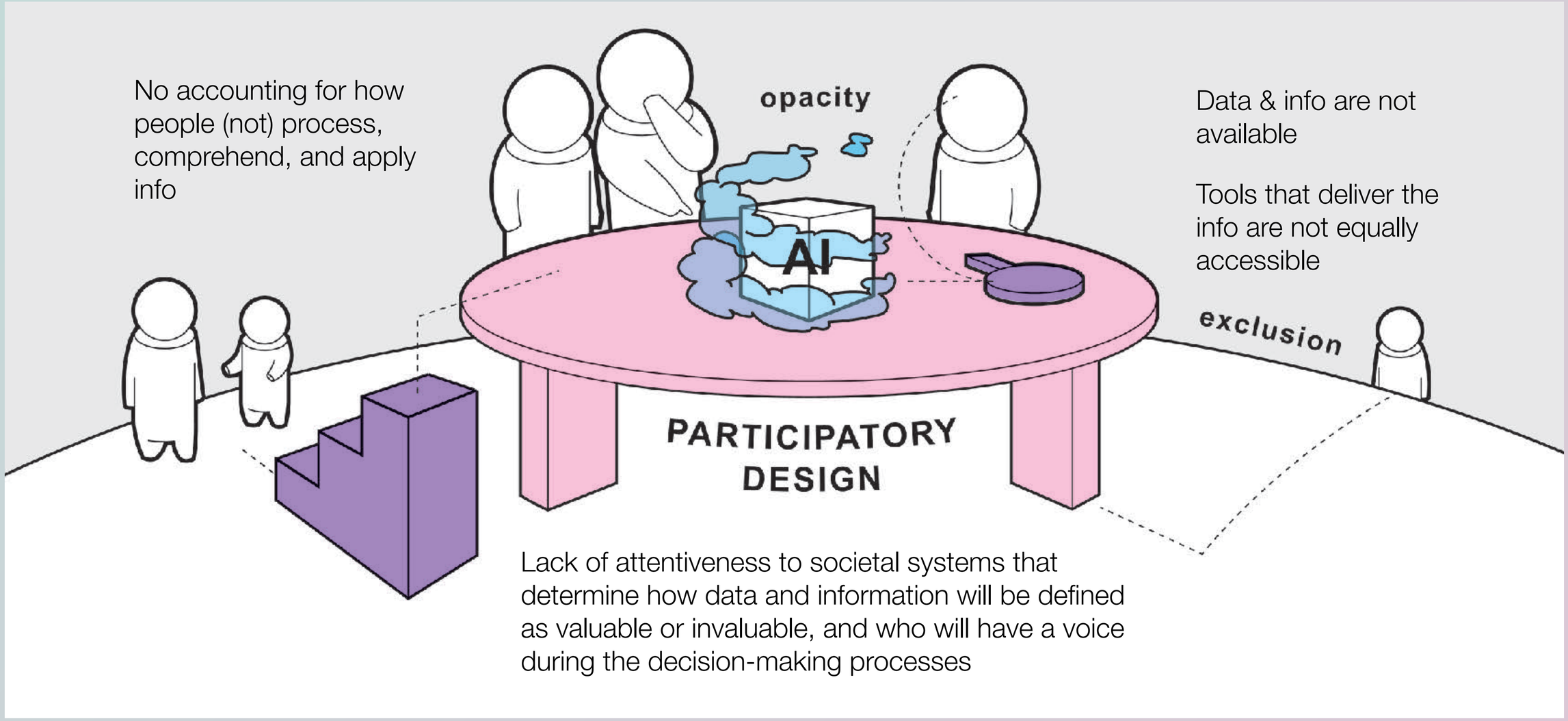
THE SURGE OF PARTICIPATORY AI

affected communities must be at the center of any approach, defining the terms of engagement, the priorities of the debate, and retelling the story of AI from the perspective of those who fall outside of its version of “normal”

Whittaker, M., Alper, M., Bennett, C. L., Hendren, S., Kaziunas, L., Mills, M., ... & West, S. M. (2019). **Disability, bias, and AI**. AI Now Institute, 8.

EXERCISING POWER IN AI TRANSITIONS

A MATTER OF INFORMATIONAL JUSTICE

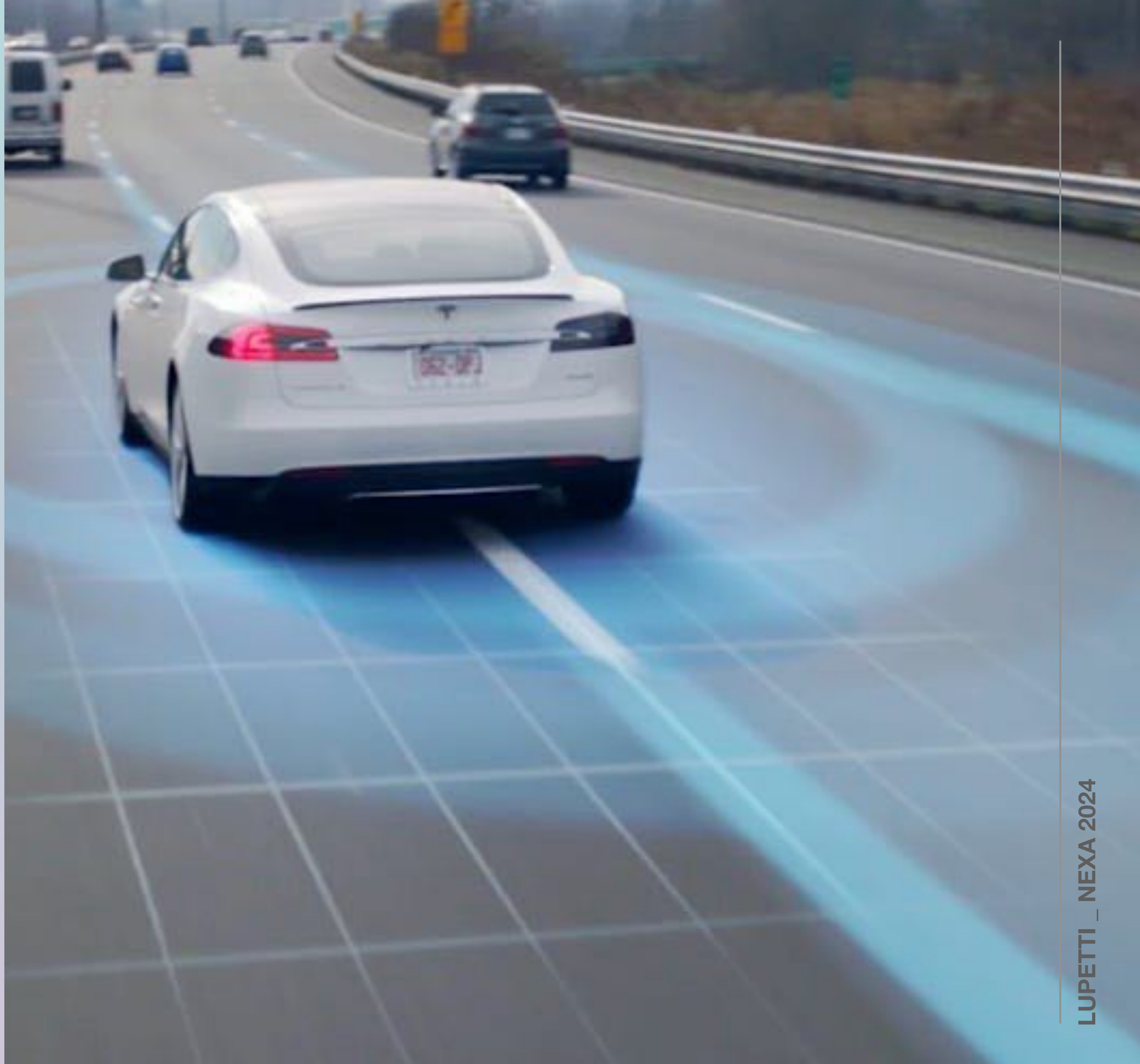


Atkins, L. C., & Mahmud, A. (2021). Informational justice: equity of access, implementation, and Interaction. In *Peace, Justice and Strong Institutions* (pp. 417-428). Cham: Springer International Publishing.

FROM DRONES TO SPARKLES

STEERING STORIES

UNDERSTANDING NARRATIVES OF DRIVING AUTOMATION (AND AI)



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NARRATIVES OF DRIVING AUTOMATION (AND AI)

AUTONOMOUS VEHICLES ARE COMING!

To save lives

To reduce injuries

To increase traffic efficiency

To provide inclusivity

Lupetti, M. L., Cavalcante Siebert, L., & Abbink, D. (2023, April). **Steering Stories: Confronting Narratives of Driving Automation through Contestational Artifacts**. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-20).

NARRATIVES OF DRIVING AUTOMATION (AND AI)

"Dominant narratives provide rational linear accounts that highlight simple causal links which can then be moulded into 'recipes for success' for managing technological change"

Dawson, P., & Buchanan, D. (2005). **The way it really happened: Competing narratives in the political process of technological change.** *Human Relations*, *58*(7), 845-865.

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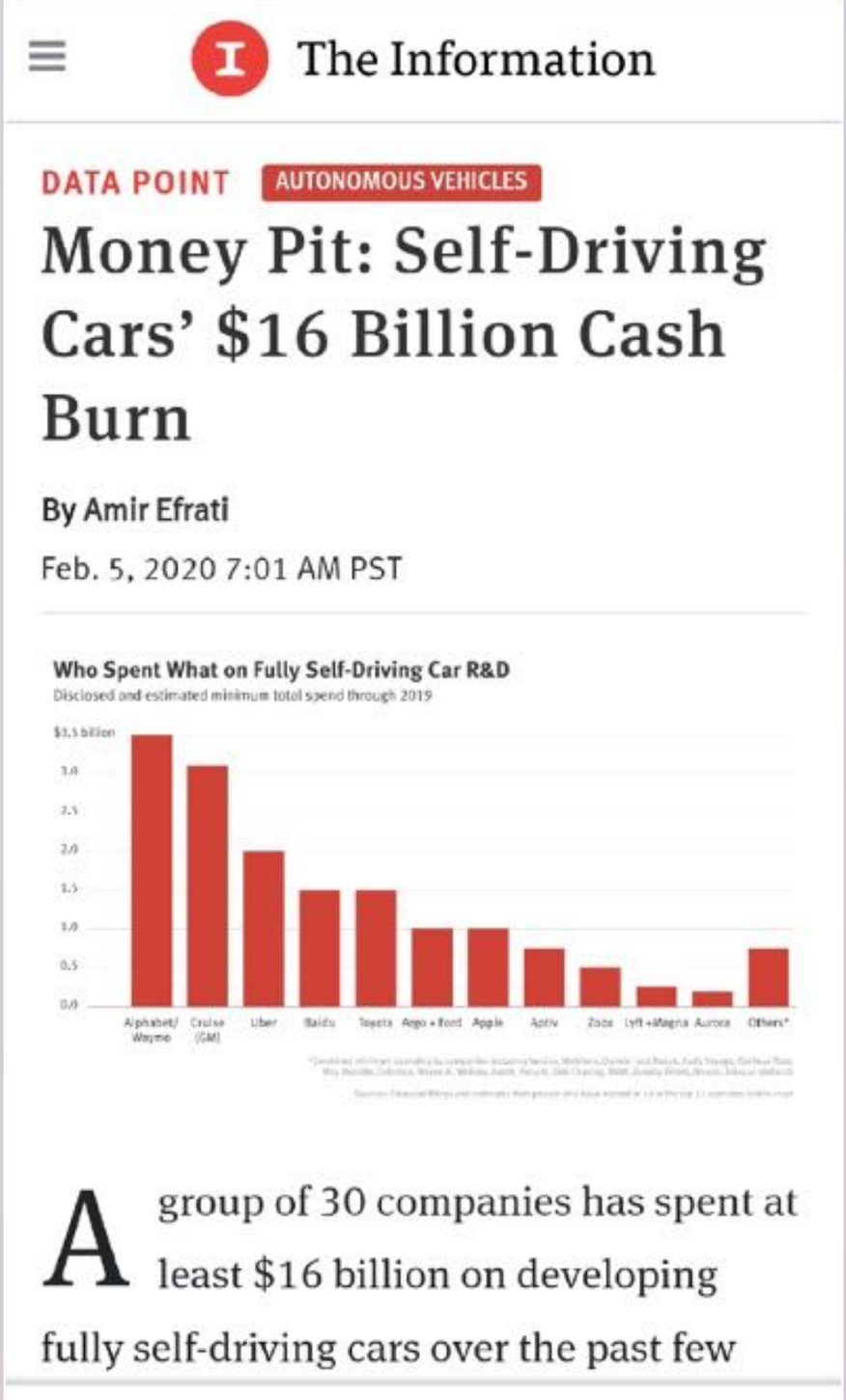

The Information

DATA POINT AUTONOMOUS VEHICLES

Money Pit: Self-Driving Cars' $16 Billion Cash Burn

By Amir Efrati

Feb. 5, 2020 7:01 AM PST

Who Spent What on Fully Self-Driving Car R&D

Disclosed and estimated minimum total spend through 2019

$3.5 billion
3.0
2.5
2.0
1.5
1.0
0.5
0.0

Alphabet/ Waymo | Cruise (GM) | Uber | Baidu | Toyota | Argo + Ford | Apple | Aptiv | Zoox | Lyft +Magna | Aurora | Others*

A group of 30 companies has spent at least $16 billion on developing fully self-driving cars over the past few

NARRATIVES OF DRIVING AUTOMATION (AND AI)

autonomous vehicles as the solution

---

the driver as the problem

as human drivers are responsible for 90% of road crashes, by removing the human from driving, autonomous vehicles should reduce road deaths and injuries by a similar percentage

Fagnant, D. J., & Kockelman, K. (2015). **Preparing a nation for autonomous vehicles: opportunities, barriers and policy recommendations**. *Transportation Research Part A: Policy and Practice*, *77*, 167-181.

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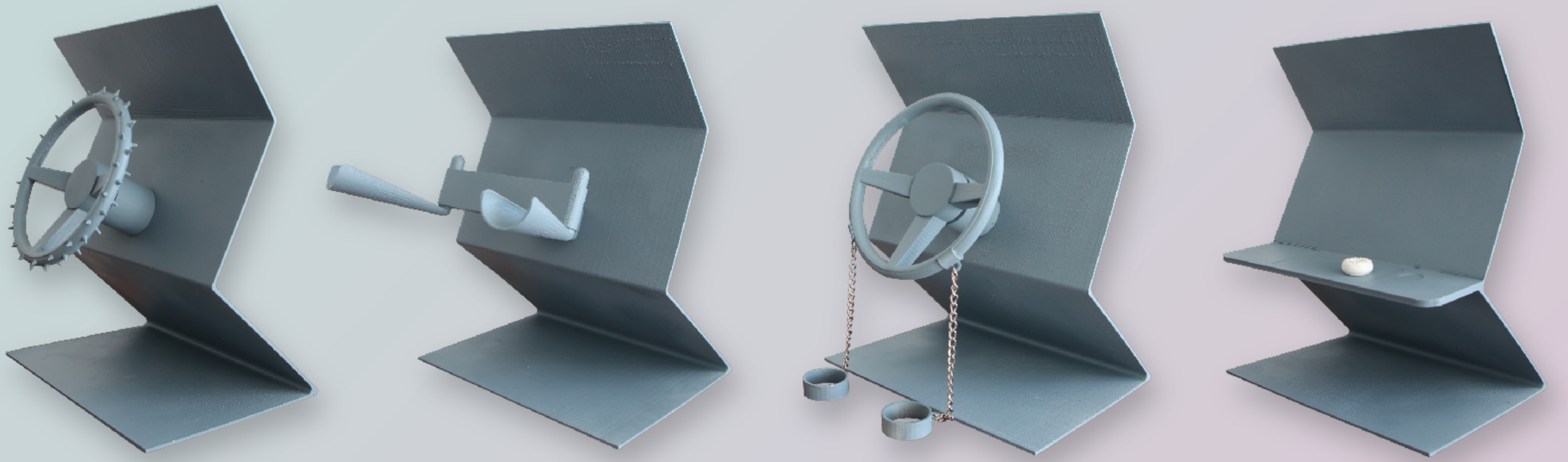
There is no single way to automate driving

Positive impact of driving automation is conditional to multiple factors

Driving automation comes in steps

Fagnant, D. J., & Kockelman, K. (2015). **Preparing a nation for autonomous vehicles: opportunities, barriers and policy recommendations**. *Transportation Research Part A: Policy and Practice*, *77*, 167-181.

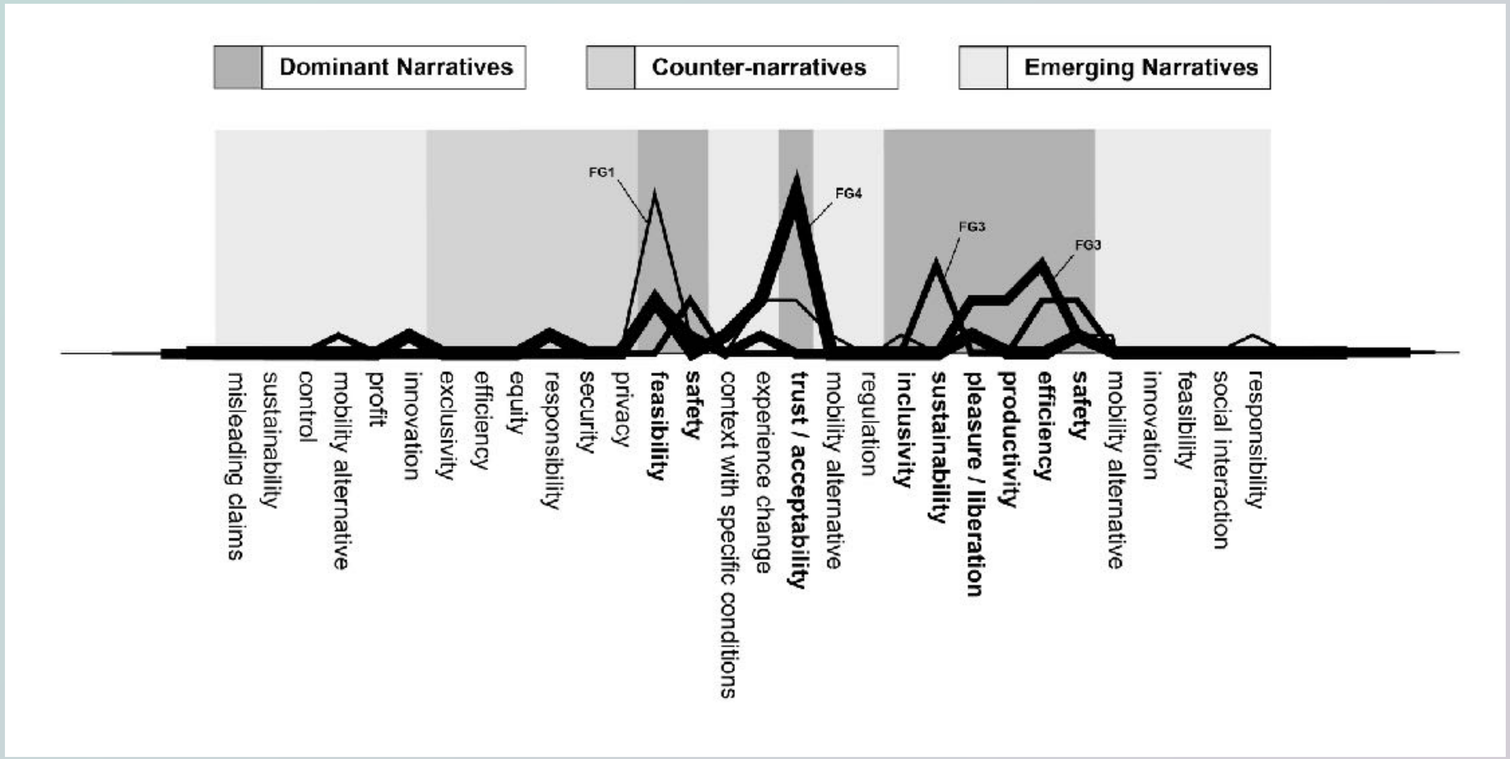
NARRATIVES OF DRIVING AUTOMATION (AND AI)



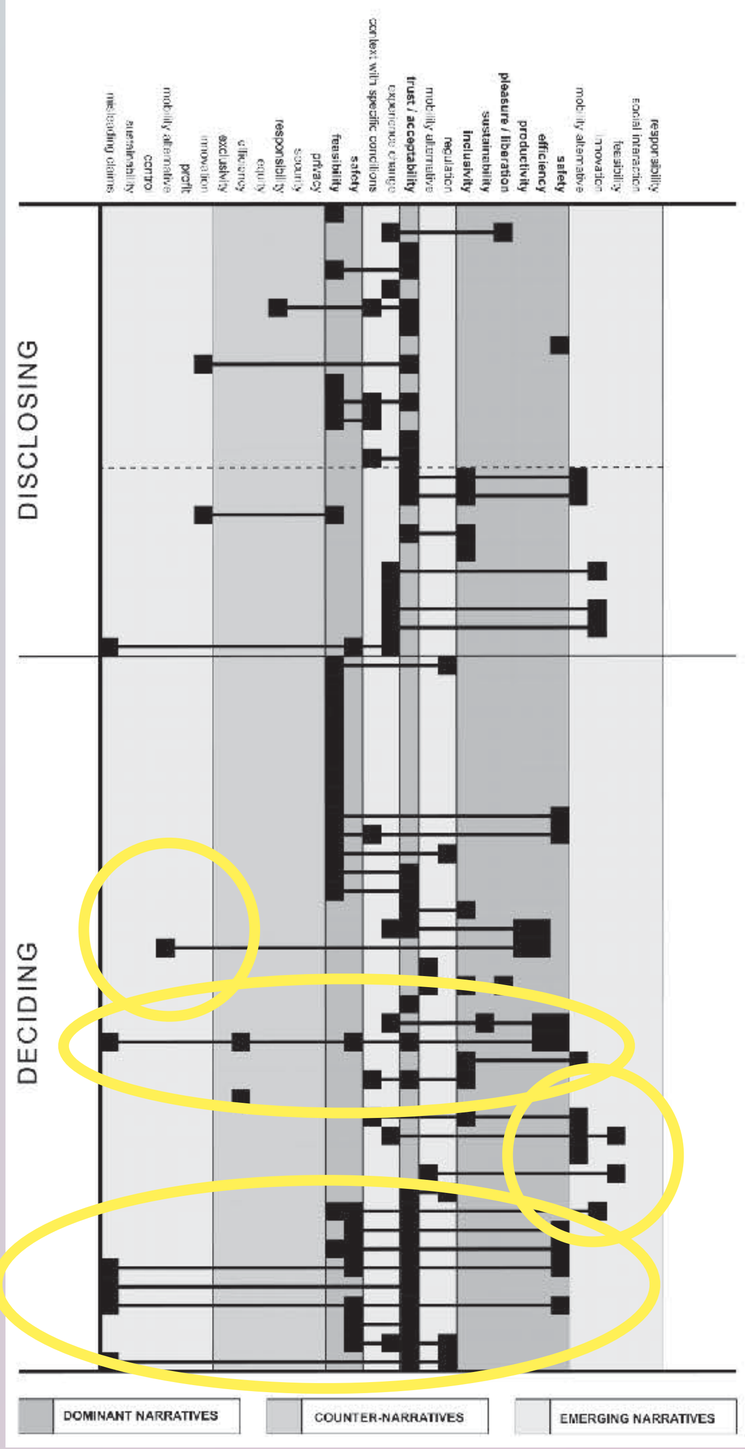
NO AUTOMATION **SHARED CONTROL** **TRADED CONTROL** **FULL AUTOMATION**

Lupetti, M. L., Cavalcante Siebert, L., & Abbink, D. (2023, April). **Steering Stories: Confronting Narratives of Driving Automation through Contestational Artifacts**. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-20).

NARRATIVES OF DRIVING AUTOMATION (AND AI)



Narrative Tensions



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NARRATIVES OF DRIVING AUTOMATION (AND AI)

Narrative Tensions

EFFICIENCY & SUSTAINABILITY	**DRIVERLESS CONNECTED MOBILITY SERVICES THAT ARE NOT PUBLIC TRANSPORT**
ACCESSIBILITY	**INCLUSIVE VEHICLES OF EXCLUSION**
FEASIBILITY	**GLOBAL STORIES OF SOMEWHERE TECHNOLOGIES**

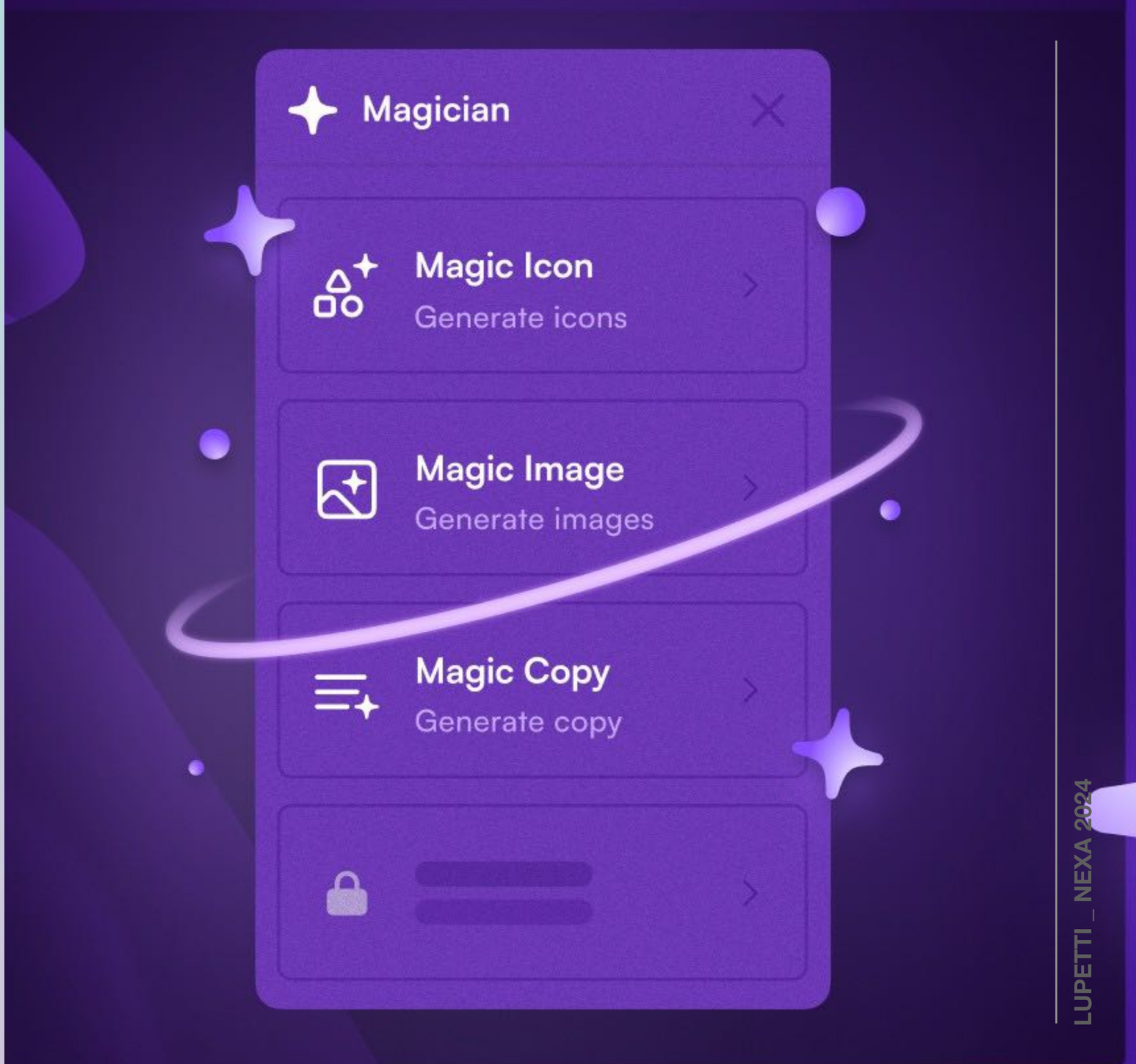
Lupetti, M. L., Cavalcante Siebert, L., & Abbink, D. (2023, April). **Steering Stories: Confronting Narratives of Driving Automation through Contestational Artifacts**. In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (pp. 1-20).

What are the rational linear accounts of AI that we are ‘receiving’ and what kind of recipe for success are we being sold?

FROM DRONES TO SPARKLES

(UN)MAKING AI MAGIC

UNDERSTANDING AND ‘CONTROLLING’ ENCHANTMENT IN AI DESIGN



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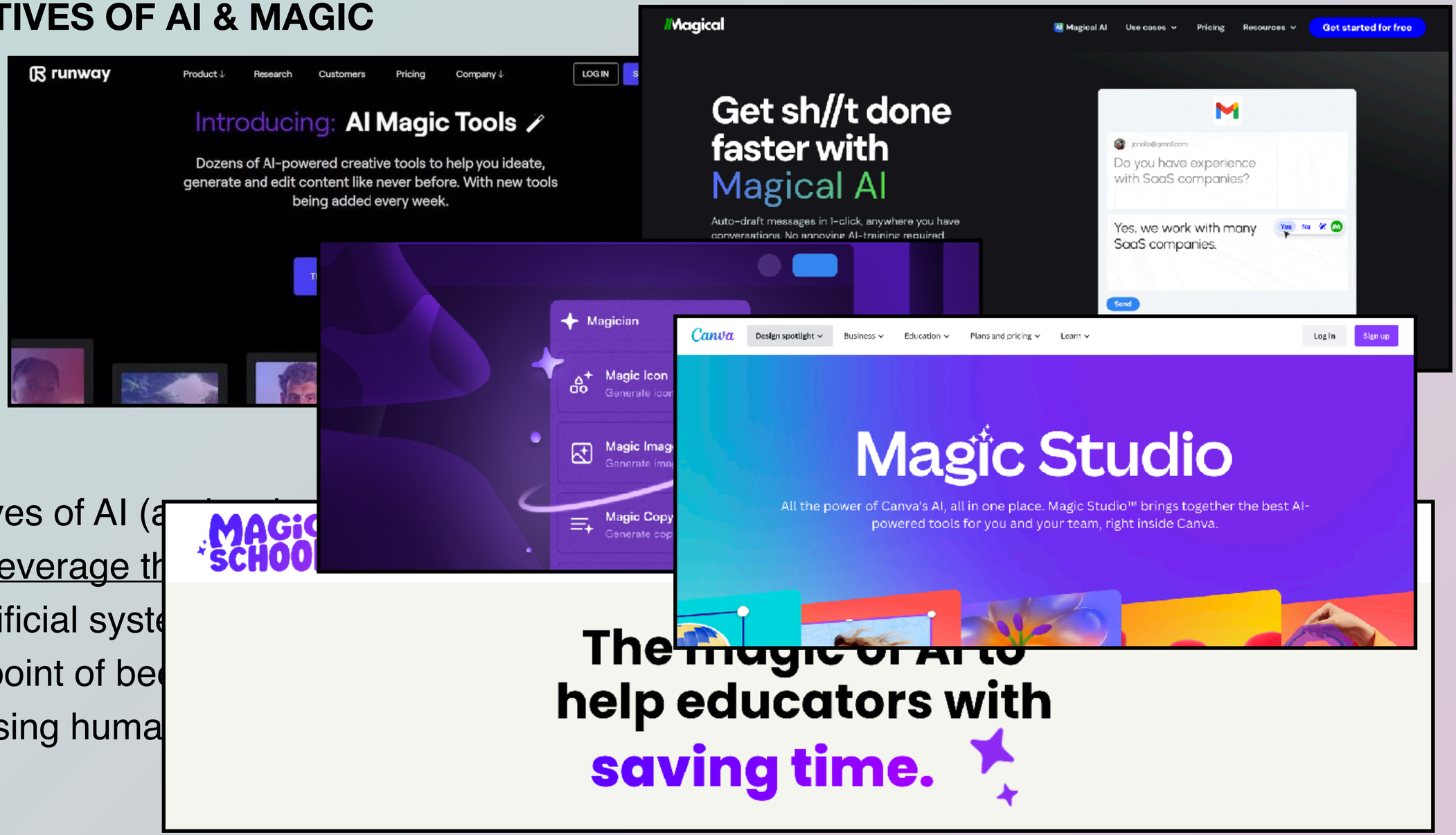
NARRATIVES OF AI & MAGIC

narratives of AI (and technology in general), subtly leverage the beliefs that the public holds that artificial systems will outperform humans, up to the point of becoming ‘beings’ capable of surpassing human intelligence

Bory, P. (2019). Deep new: **The shifting narratives of artificial intelligence from Deep Blue to AlphaGo**. *Convergence*, *25*(4), 627-642.

NARRATIVES OF AI & MAGIC



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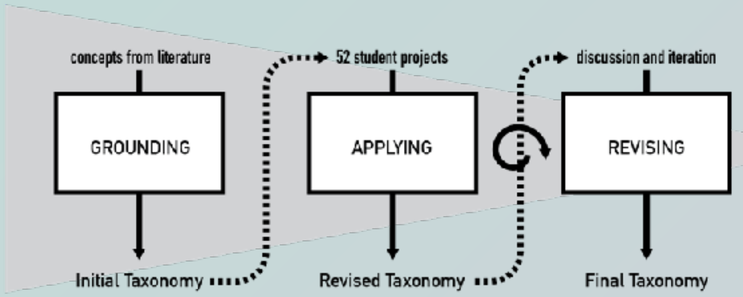
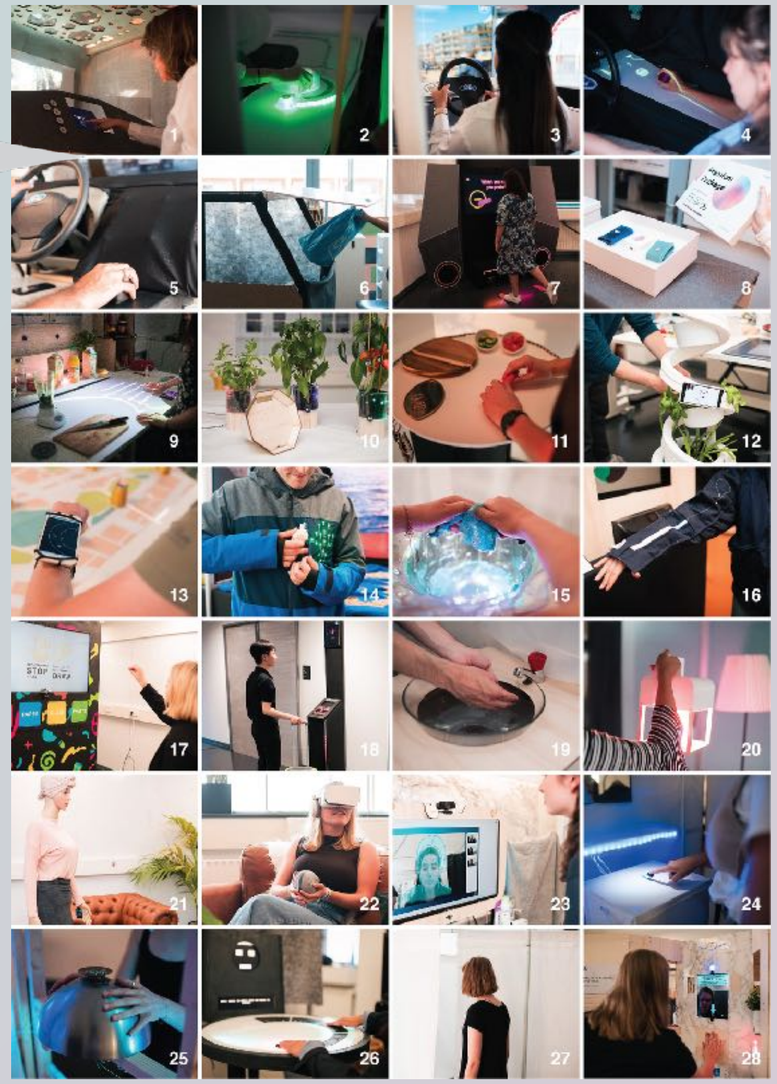
What is the relationship between AI magic narratives and design of AI products?

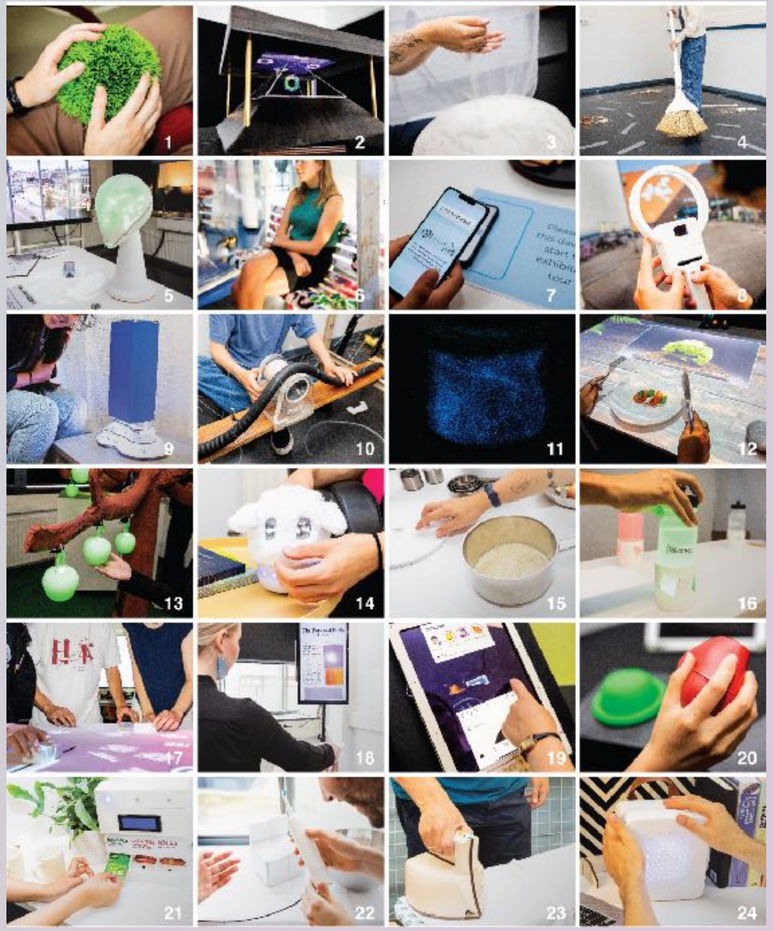
NARRATIVES OF AI & MAGIC



52 ITD PROJECTS



28 (2022)



24 (2023)

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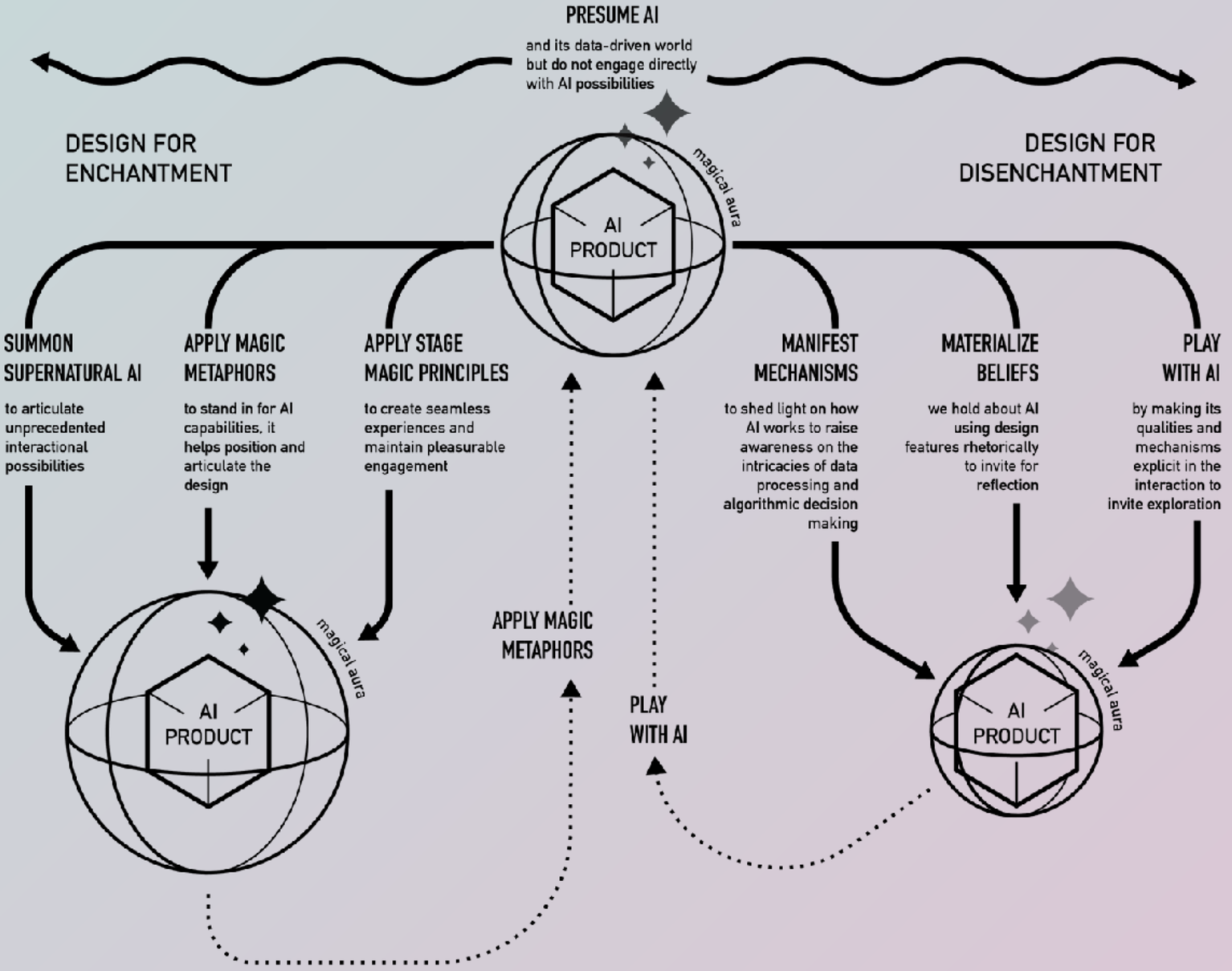
AI & MAGIC

TAXONOMY



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AI & MAGIC

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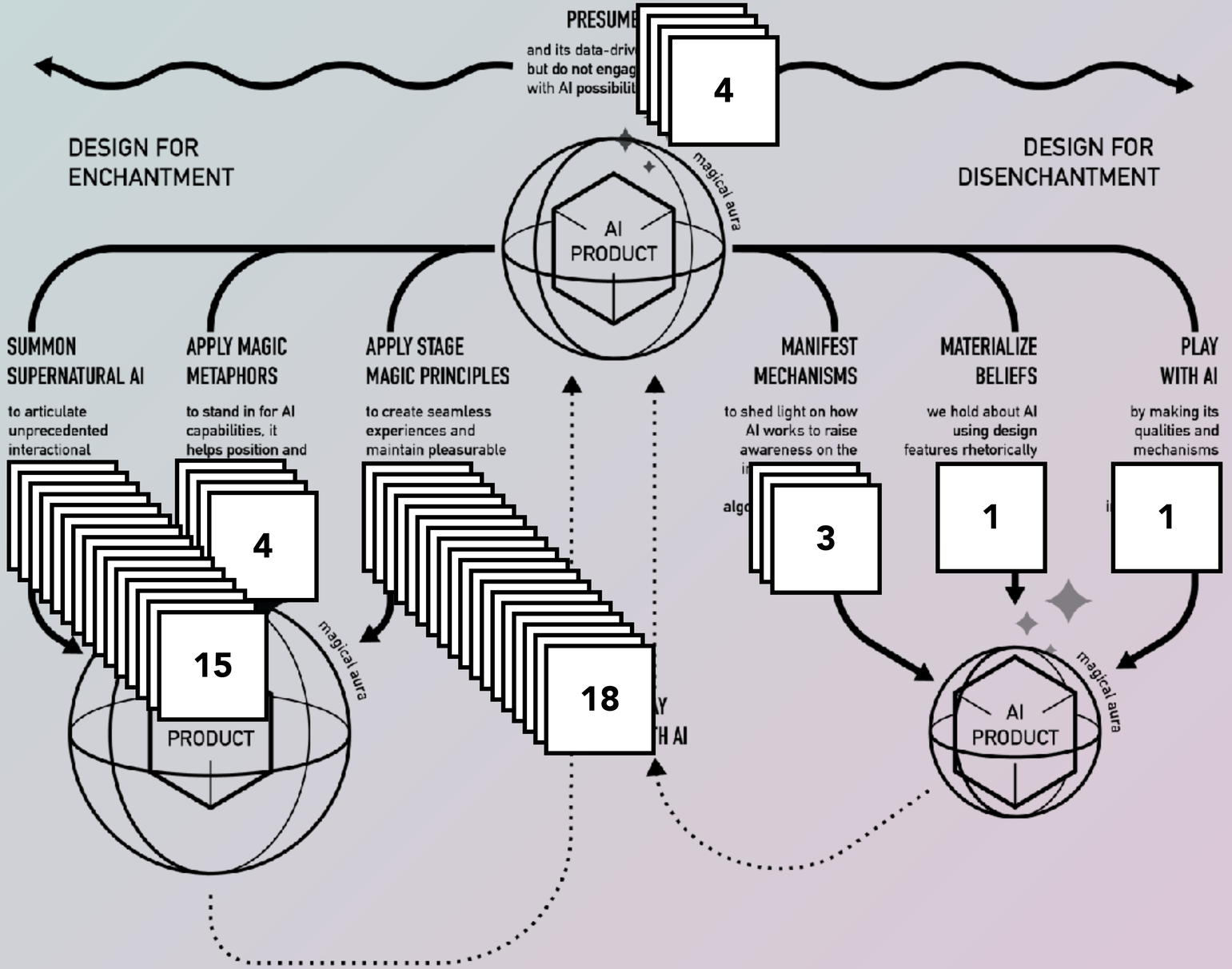

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AI & MAGIC

TAXONOMY

SUMMON AI

PRESUME AI

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AI & MAGIC

TAXONOMY

SUMMON AI

Role Play
Wizard of Oz

PRESUME AI

Deep engagement
with technologies

PLAY WITH AI

MANIFEST MECHANISMS

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AI & MAGIC

TAXONOMY

enchantment affects users,
but also and foremost designers

SUMMON AI

Role Play
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Should we just engage more with AI?

FROM DRONES TO SPARKLES

THE UNBEARABLE LIGHTNESS OF PROMPTING

COUNTING THE ENERGY COSTS OF GENAI WORKSHOPS FOR DESIGNERS

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GRASPING AI IMPACT

Should we just engage more with AI?

AI EXERCISES FOR DESIGNERS _ TU DELFT 2022-23

WORKSHOP ON GENAI FOR DESIGNERS _ SAN MARINO 2023

WORKSHOP ON SPECULATIVE AI _ DOMUS ACADEMY 2024

WORKSHOP ON GENAI FOR IMAGINATION _ UNIVERSITY OF MICHIGAN 2024

SUMMER SCHOOL ON SPECULATIVE AI _ POLITO 2024

GENAI EXERCISES FOR DESIGNERS _ TSINGHUA UNIVERSITY 2024

WORKSHOP ON GENAI FOR DESIGN SPECULATIONS _ POLIMI 2024

GRASPING AI IMPACT

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WORKSHOP ON GENAI FOR DESIGN SPECULATIONS _ POLIMI 2024

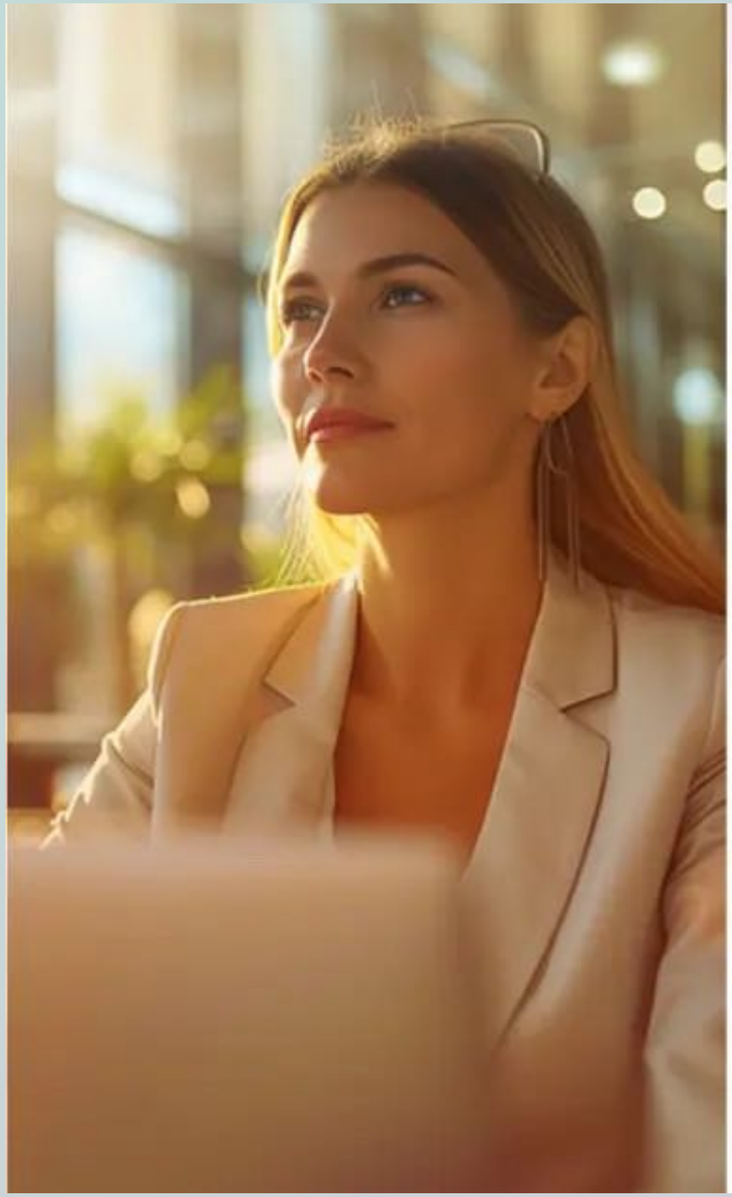
…ish

[redacted]

La parte più inquietante di questo post e che molti dei commentatori non sembrano riconoscere un'immagine creata con AI (nel caso specifico con Midjourney da @matitectura) da una vera realizzazione, e questo aspetto mi preoccupa parecchio...

2 g Mi piace Rispondi 107

[redacted] il problema che genera l'A.I. è proprio questo e con l'avanzare della tecnologia sarà sempre peggio.



Organizations with fully modernized, AI-led processes nearly doubled in a year

From 2023	To 2024
9%	16% ↑

Performance compared to peers

3.3x
greater success at **scaling high-value gen AI** use cases

2.4x
greater improvements in **productivity**

2.5x
higher **average revenue growth**

Source: Accenture report How reinvention-ready companies are driving growth and relevance with gen AI

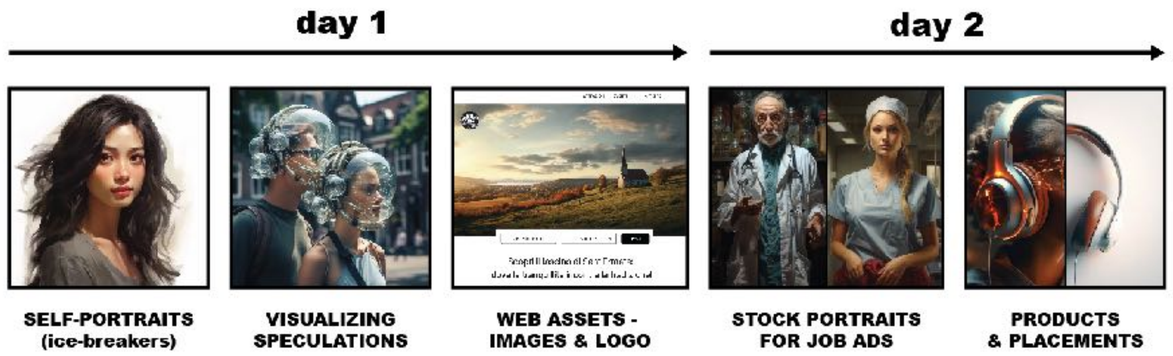
@accenture

GRASPING AI IMPACT

it is important to prepare students for their future careers but also imperative to inform them about the societal impact of (gen)AI

GRASPING AI IMPACT

COUNTING THE COSTS OF A TWO-DAY WORKSHOP ON GENAI FOR DESIGNERS



Teacher

Total images 602

Conversion rate 7%

Students

Total images 10470

Conversion rate 4.8%

Workshop

Total images 11072

Lupetti, M. L., Cavallin, E., & Murray-Rust, D. (UNDER REVIEW). **The Unbearable Lightness of Prompting: A Critical Reflection on the Environmental Impact of genAI use in Design Education**

GRASPING AI IMPACT

COUNTING THE COSTS OF A TWO-DAY WORKSHOP ON GENAI FOR DESIGNERS

Unit	kWh
1 hour of genAI workshop per student	0,05
a smartphone charge	0,022
1 hour of video streaming	0,077
1 hour of professional grade image rendering	0,07
I hour of laptop use	0,054

Energy costs of genAI workshop calculated with costs reported by Luccioni et al. 2024

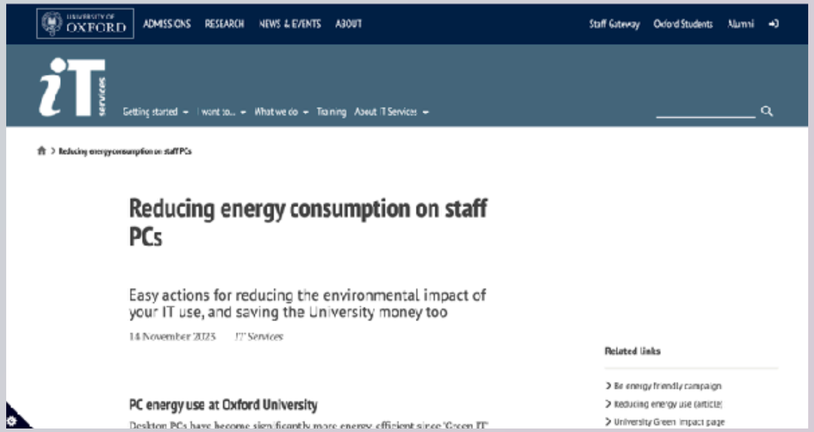
Lupetti, M. L., Cavallin, E., & Murray-Rust, D. (UNDER REVIEW). **The Unbearable Lightness of Prompting: A Critical Reflection on the Environmental Impact of genAI use in Design Education**

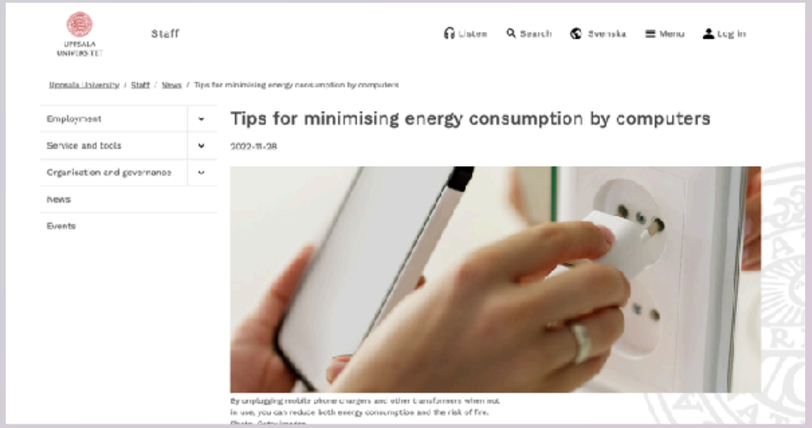
GRASPING AI IMPACT

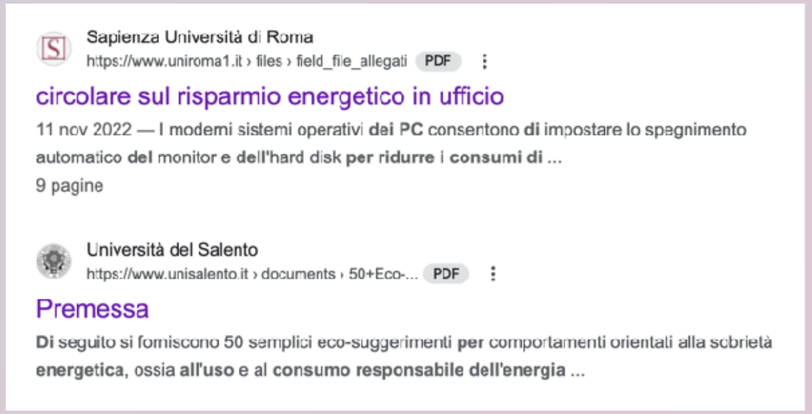
COUNTING THE COSTS OF A TWO-DAY WORKSHOP ON GENAI FOR DESIGNERS

Universities use 3 to 5 more times energy than schools and consume 60% more energy than commercial offices.

Computing alone accounts for 18/19% of total average university demand







Munaro, M. R., & John, V. M. (2024, May). **Energy Efficiency in the Higher Education Institutions: A Review of Actions and Their Contribution to Sustainable Development.**

https://enpowered.com/3-energy-lessons-universities-cant-afford-to-skip/

https://esource.bizenergyadvisor.com/article/colleges-and-universities

GRASPING AI IMPACT

COUNTING THE COSTS OF A TWO-DAY WORKSHOP ON GENAI FOR DESIGNERS

The estimated energy consumption is striking if we consider that mine was not an isolated event but a small example in a constellation of emerging educational practices.
There is an increasing number of educational programs that are integrating genAI, being run across the globe: from semester-long courses, to workshops and sessions lasting days or hours, tens or even hundreds of students use genAI daily.

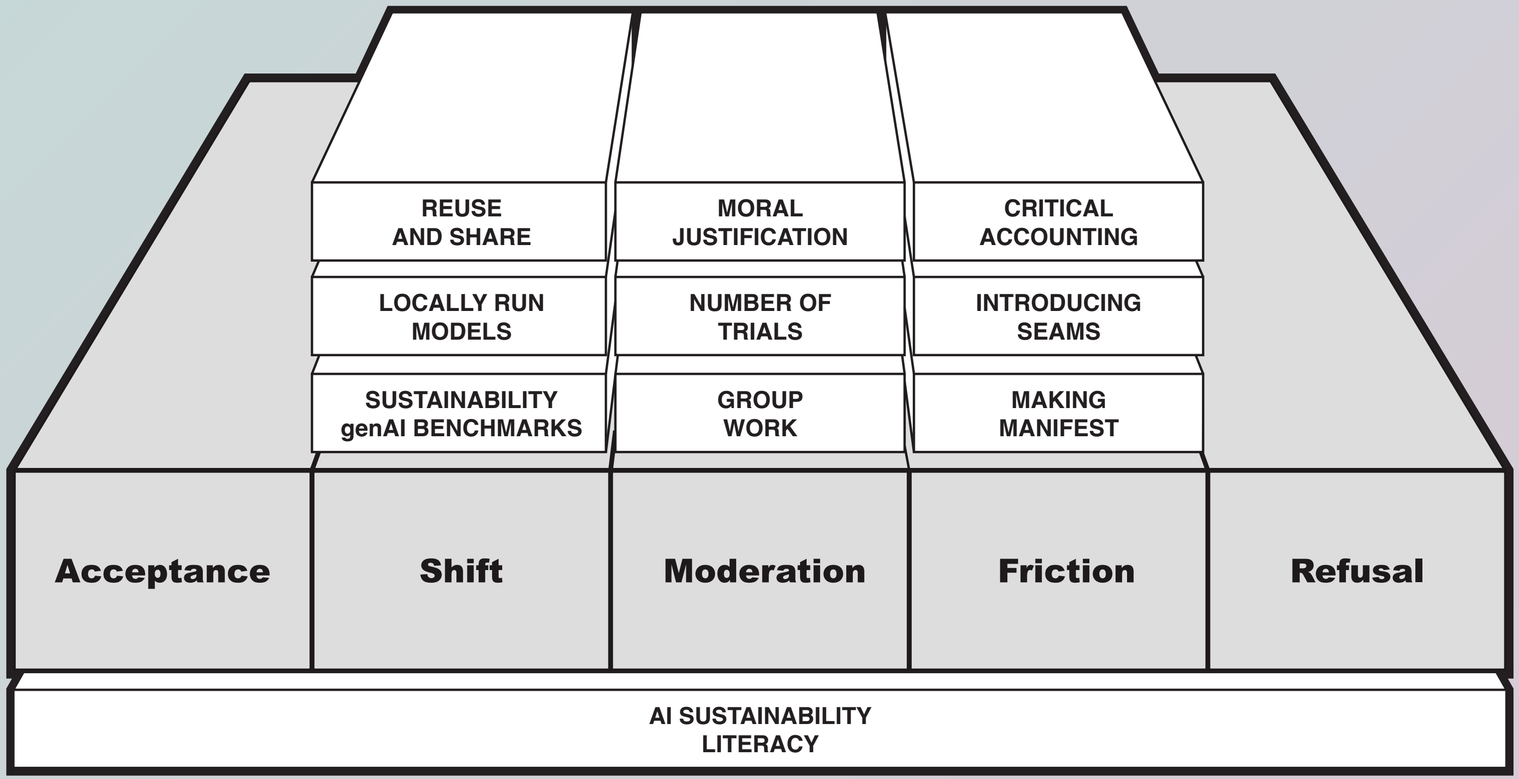
63.4% of students surveyed by a study in Germany stated that they have used AI-based tools for their studies

Lupetti, M. L., Cavallin, E., & Murray-Rust, D. (UNDER REVIEW). **The Unbearable Lightness of Prompting: A Critical Reflection on the Environmental Impact of genAI use in Design Education.**

Von Garrel, J., & Mayer, J. (2023). **Artificial Intelligence in studies—use of ChatGPT and AI-based tools among students in Germany.** *humanities and social sciences communications*, *10*(1), 1-9.

GRASPING AI IMPACT

Changing educational practices

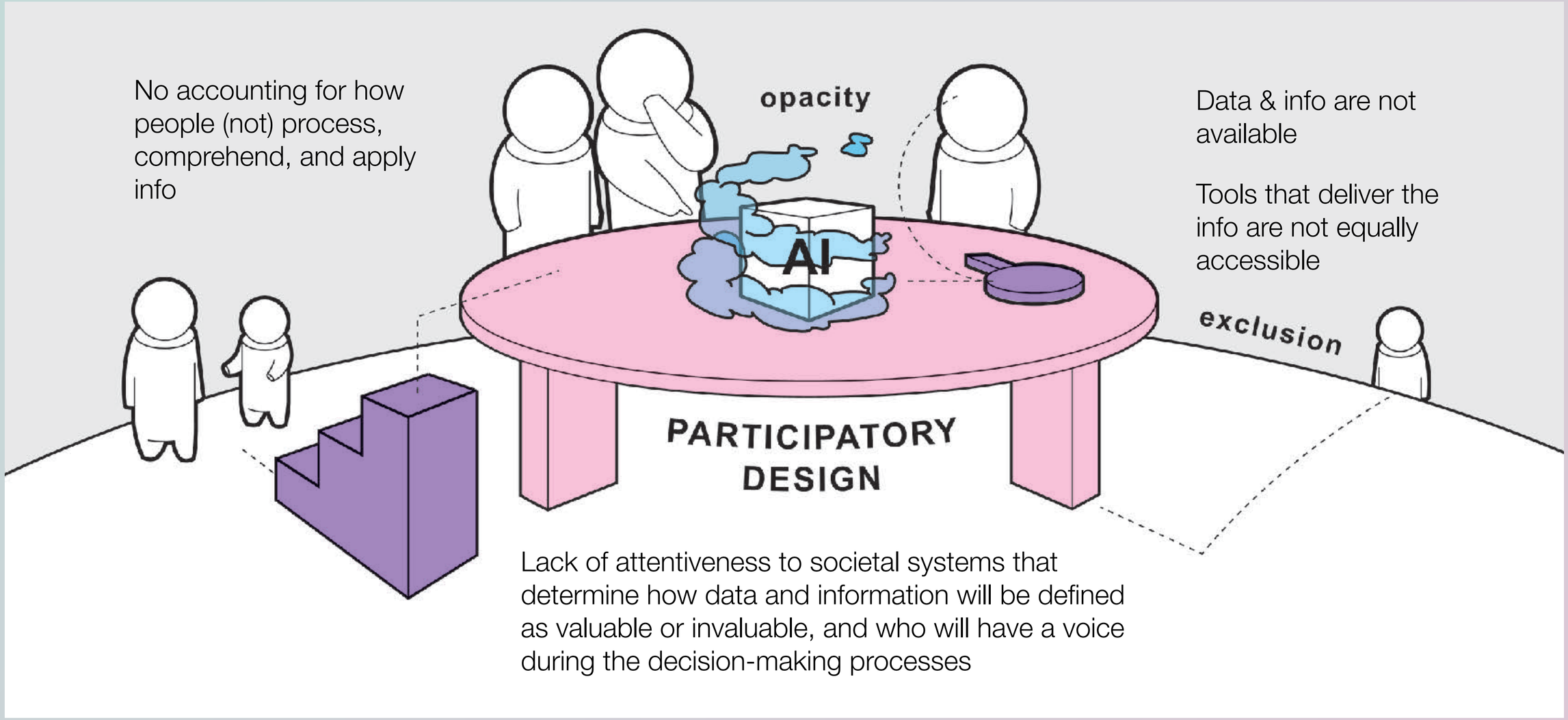


Nurturing critical reflexivity and accountability

Lupetti, M. L., Cavallin, E., & Murray-Rust, D. (UNDER REVIEW). **The Unbearable Lightness of Prompting: A Critical Reflection on the Environmental Impact of genAI use in Design Education.**

WHAT DOES THIS ALL MEANS FOR US?

Steering research agendas



Atkins, L. C., & Mahmud, A. (2021). Informational justice: equity of access, implementation, and Interaction. In *Peace, Justice and Strong Institutions* (pp. 417-428). Cham: Springer International Publishing.

How do we move from research experiments on contestation to public platforms for free expression of informed dissent?

What spaces for public engagement do we need to create?

What AI boundaries objects should we make?

How should we communicate AI better?

Thank you!